DOCUMENT RESUME

ED 158 133 CE 017 783

TITLE	Health Occupations. Medical Technologists, Technicians, and Assistants; Dispensing Opticians; Ophthalmic Laboratory Technicians; Medical Record Personnel. Reprinted from the Occupational Outlook Handbook, 1978-79 Edition.
INSTITUTION	Bureau of Labor Statistics (DOL), Washington, D.C.
REPORT NO	Bull-1955-29
PUB DATE	78
NOTE	25p.; Photographs in this document will not reproduce well; For related documents see CE 017 756-797
AVAILABLE FROM	Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 ($0.50 per reprint; $8.00 for set of 42)
EDRS PRICE	MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS	Administrative Personnel; Emergency Squad Personnel; *Employment Opportunities; *Employment Projections; *Employment Qualifications; Employment Trends; *Health Occupations; *Health Personnel; Hospital Personnel; Information Sources; Inhalation Therapists; Job Skills; Job Training; Medical Laboratory Assistants; Medical Record Librarians; Medical Record Technicians; Medical Technologists; *Occupational Information; Occupational Mobility; Ophthalmology; Paraprofessional Personnel; Promotion (Occupational); Radiologic Technologists; Salaries; Surgical Technicians; Wages; Work Environment

ABSTRACT

Focusing on health occupations, this document is one in a series of forty-one reprints from the Occupational Outlook Handbook providing current information and employment projections for individual occupations and industries through 1985. The specific occupations covered in this document include dispensing opticians, electrocardiograph technicians, electroencephalographic technologists/technicians, emergency medical technicians, medical laboratory workers, medical record administrators, medical record technicians/clerks, operating room technicians, ophthalmic laboratory technicians, optometric assistants, radiologic (X-Ray) technologists, and respiratory therapy workers. The following information is presented for each occupation or occupational area: a code number referenced to the Dictionary of Occupational Titles; a description of the nature of the work; places of employment; training, other qualifications, and advancement; employment outlook; earnings and working conditions; and sources of additional information. In addition to the forty-one reprints covering individual occupations or occupational areas (CE 017 757-797), a companion document (CE 017 756) presents employment projections for the total labor market and discusses the relationship between job prospects and education. (BM)

ED158133

Health Occupations

CE

Medical technologists, technicians, and assistants; dispensing opticians; ophthalmic laboratory technicians; medical record personnel

Reprinted from the Occupational Outlook Handbook, 1978-79 Edition.

U.S. Department of Labor
Bureau of Labor Statistics
1978

Bulletin 1955-29

Containing the midpoints of the legs of right triangle *RST*, whe pt. (−5, 5), *S* is pt. (1, 1), and *T* is pt. (3, 4).

Containing the longer diagonal of a quadrilateral whose vertic pts. (2, 2), (−2, −2), (1, −1), and (6, 4).

Show that the equations $y - 1 = \frac{1}{2}(x + 3)$ and $y - 4 = \frac{1}{2}(x$ are equivalent.

An equation of the line containing pts. (−2, 3) and (4, −1) c written in the form $y - 3 = -\frac{1}{2}(x + 2)$ or in the $y + 1 = -\frac{1}{2}(x - 4)$, depending upon which point you take (x_1, y_1). Show that the two equations are equivalent.

Show that the equations are equivalent.

$$y - y_1 = \frac{y_2 - y_1}{x_2 - x_1}(x - x_1) \qquad y - y_2 = \frac{y_1 - y_2}{x_1 - x_2}(x - x$$

State the equation of a line through pt. (p, q) and parallel to containing pts. (a, b) and (c, d). $(a \neq c)$.

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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CE 017 783

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DISPENSING OPTICIANS

(D.O.T. 713.251, and 299.884)

Nature of the Work

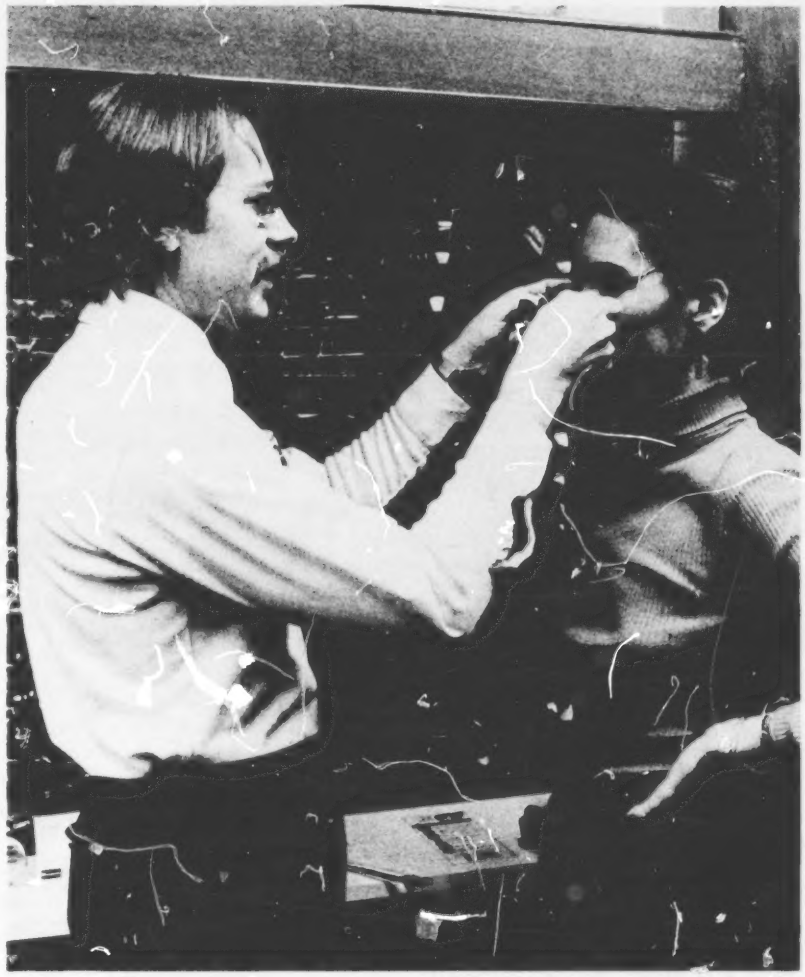
About 100 million people in the United States use some form of corrective lenses to improve their vision. Dispensing opticians (also called *ophthalmic dispensers*) receive lens prescriptions from eye doctors (ophthalmologists) or optometrists, determine the size and style of eyeglasses desired by the customer, write work orders for ophthalmic laboratory technicians, and adjust finished glasses to fit the customer. In many States they fit contact lenses.

Dispensing opticians determine where lenses should be placed in relation to the customer's eyes by measuring the distance between the centers of the pupils. They also assist the customer in selecting the proper eyeglass frame by measuring the customer's facial features and showing the various styles and colors of frames.

Dispensing opticians analyze and interpret prescriptions and prepare work orders that give ophthalmic laboratory technicians the information they need to properly, grind the lenses, and insert them in a frame. The work orders include lens prescriptions and information on lens size, color, and style. After glasses are made, dispensing opticians use a special instrument to check the power and surface quality of the lenses. Opticians then adjust the frame to the contours of the customer's face and head so that it fits properly and comfortably. Adjustments are made with handtools, such as optical pliers, files, and screwdrivers. A special instrument is used to check the power and surface quality of the lenses.

In fitting contact lenses, dispensing opticians follow ophthalmologists' or optometrists' prescriptions, measure the corneas of customers' eyes and then prepare specifications to be followed by the contact lens manufacturer. Contact lens fitting requires considerably more skill, care, and patience than conventional eyeglass fitting. Dispensing opticians tell customers how to insert, remove, and care for contact lenses during the initial adjustment period, which may last several weeks. The dispensing optician examines the patient's eyes, cornea, lids, and contact lens with special instruments and microscopes at each visit. Ophthalmologists or optometrists recheck the fit, as needed. Opticians may make minor adjustments; lenses are returned to the manufacturer for major changes.

The majority of dispensing opticians are in the general practice of designing and fitting eyeglasses. Some specialize in the fitting of cosmetic shells to cover blemished eyes. Still others specialize in the fitting of prosthesis (artificial eyes). In some shops, they may do lens grinding and finishing and sell other optical goods such as binoculars, magnifying glasses, and nonprescription eyeglasses.



Dispensing optician adjusts finished glasses to fit the customer.

Places of Employment

About 14,500 persons worked as dispensing opticians in 1976. Most dispensing opticians work for retail optical shops or department stores and other retail stores that sell prescription lenses. Many also work for ophthalmologists or optometrists who sell glasses directly to patients. A few work in hospitals and eye clinics and teach in schools of ophthalmic dispensing. Many dispensing opticians own retail optical shops.

Dispensing opticians can be found in every State. However, employment is concentrated in large cities and in populous States.

Training, Other Qualifications, and Advancement

Most dispensing opticians learn their skills on the job. On-the-job training in dispensing work may last several years and usually includes instruction in optical mathematics, optical physics, and the use of precision measuring instruments.

Formal institutional training for the dispensing optician is available for high school graduates. In 1977, 1[illegible] schools offered 2-year full-time courses in optical fabricating and dispensing work leading to an associate degree. In addition, large manufacturers of contact lenses offer nondegree courses in lens-fitting that usually last a few weeks. A small number of opticians learn their trade in the Armed Forces.

High school graduates also can prepare for optical dispensing work through 3- to 4-year formal apprenticeship programs. Apprentices with exceptional ability may complete their training in a shorter period.

Apprentices receive training in optical mathematics and optical physics and in the use of laboratory equipment. In addition to technicial training, apprentices are given an opportunity to work directly with patients in the fitting of both eyeglasses and contact lenses. Trainees also are taught the basics of office management and sales.

Employers prefer applicants for entry jobs as dispensing opticians to be high school graduates who have had courses in the basic sciences. A knowledge of physics, algebra, geometry, and mechanical drawing is particularly valuable. Interest in and ability to do precision work are essential. Because dispensing opticians deal directly with the public, they should be tactful and have pleasant personalities.

In 1976, 19 States had licensing requirements governing dispensing opticians: Alaska, Arizona, California, Connecticut, Florida, Georgia, Hawaii, Kentucky, Massachusetts, Nevada, New Jersey, New York North Carolina, Rhode Island, South Carolina, Tennessee, Vermont, Virginia, and Washington. To obtain a license, the applicant generally must meet certain minimum standards of education and training, and also must pass either a written or practical examination, or both. For specific requirements, the licensing boards of individual States should be consulted.

Many dispensing opticians go into business for themselves. Others may advance by becoming managers of retail optical stores or becoming sales representatives for wholesalers or manufacturers of eyeglasses or lenses.

Employment Outlook

Employment of dispensing opticians is expected to increase faster than the average for all occupations through the mid-1980's. In addition to the job openings from employment growth, some openings will arise from the need to replace experienced workers who retire, die, or leave the occupation for other reasons. The demand for eyeglasses is expected to increase as a result of increases in population and a greater awareness of the need for eyeglasses. State programs to provide eye care for low-income families, union health insurance plans, and Medicare also will stimulate demand. Moreover, the growing variety of frame styles and colors may encourage individuals to buy more than one pair of glasses.

Employment opportunities will be particularly favorable for dispensing opticians who have associate degrees in opticianry. Opportunities will be best in metropolitan areas because many of the retail optical shops in small communities are operated solely by owners and do not need dispensing opticians.

Earnings and Working Conditions

Hourly wage rates for dispensing opticians ranged from $5 to $8 in 1976 based on information from a small number of union contracts. Dispensing opticians who own their own shops can earn considerably more.

Apprentices start at about 60 percent of the skilled worker's rate and are increased periodically so that upon completion of the apprenticeship program, they receive the beginning rate for experienced workers.

Working conditions are generally pleasant, quiet, and clean. Dispensing opticians in retail shops generally work a 5 1/2- or 6-day week.

Some dispensing opticians are members of unions. The principal union in this field is the International Union of Electrical, Radio and Machine Workers (AFL-CIO).

Sources of Additional Information

A list of schools offering courses for people who wish to become dispensing opticians is available from:

National Academy of Opticianry, 514 Chestnut St., Big Rapids, Mich. 49307.

National Federation of Opticianry Schools, 300 Jay St., Brooklyn, N.Y. 11201.

For general information about the occupation, contact:

International Union of Electrical, Radio and Machine Workers, 1176 16th St. NW., Washington, D.C. 20036.

National Federation of Opticianry Schools 300 Jay St., Brooklyn, N.Y. 11201.

Opticians Association of America, 1250 Connecticut Ave. NW., Washington, D.C. 20036.

ELECTROCARDIOGRAPH TECHNICIANS

(D.O.T. 078.368)

Nature of the Work

Electrocardiograms (EKG's) are graphic heartbeat tracings produced by an instrument called an electrocardiograph. These tracings record the electrical changes that occur during a heartbeat. Physicians use electrocardiograms to diagnose irregularities in heart action and to analyze changes in the condition of a patient's heart over a period of time. Some physicians order electrocardiograms as a routine diagnostic procedure for persons who have reached a specified age. Electrocardiograms are required as part of pre-employment physical examinations for people in many fields. In some cases, the tests also are used if surgery is to be performed.

At the request of a physician, electrocardiograms can be recorded in a doctor's office, in the EKG department of a hospital, or at the patient's bedside, since the equipment is mobile. The technician straps electrodes to specified parts of the patient's body, manipulates switches of the electrocardiograph, and moves electrodes across the patient's chest. The technician must know the anatomy of the chest and heart to properly select the exact locations for the chest electrodes, since the wrong selection yields an inaccurate diagnosis. The test may be given while the patient is at rest, or before and after mild exercise.

The electrocardiograph records the "picture" of the patient's heart action on a continuous roll of paper. The technician then clips and mounts this electrocardiogram for analysis by a physician, usually a heart specialist. Technicians must recognize and correct any technical errors in the machine such as crossed wires or electrical interference, that prevent an accurate reading. They also must call the doctor's attention to any significant deviations from the norm.

EKG technicians sometimes conduct other tests such as vectorcardiograms, which are three-dimensional traces, phonocardiograms, which record the sounds of the heart valves and blood passing through them, stress testing (exercise tests), pulse readings, and Holter monitoring and scanning, which is a 12- to 24-hour recording of electrocardiography. Some technicians do echocardiography, which utilizes very high frequency sound waves—"ultra sound"—to detect heart problems, such as congenital defects. In addition, technicians usually schedule appointments, type doctors' diagnoses, maintain patients' EKG files, and care for equipment.

The electrocardiograph records the "picture" of the patient's heart action.

Places of Employment

Nearly 12,000 persons worked as electrocardiograph technicians in 1976. Most EKG technicians worked in cardiology departments of large hospitals. Others worked part time in small general hospitals where workloads are usually not great enough to demand full-time technicians. Some worked full or part time in clinics and doctors' offices.

Training, Other Qualifications, and Advancement

Generally, EKG technicians are trained on the job. Training—usually conducted by an EKG supervisor or a cardiologist—lasts from 3 to 6 months for the basic EKG tests and up to 1 year for the more complex ones. Vocational schools in several states and junior colleges give college credit for cardiology technology courses, and some colleges have added cardiology technology to their curricula. Generally, the minimum educational requirement for the job is high school graduation. Among high school courses that are recommended for students interested in this field are health, biology, and typing. Familiarity with medical terminology also is helpful and can be acquired in classes on human anatomy and physiology and by studying a medical dictionary.

Persons who want to become EKG technicians should have mechanical aptitude, the ability to follow detailed instructions, presence of mind in emergencies, reliability, and patience.

Though opportunities for advancement generally are limited, large hospitals sometimes promote EKG technicians to supervisors. Advancement to cardiovascular technician, cardiopulmonary technician, and cardiology technologist also is possible.

Employment Outlook

The employment of EKG technicians is expected to grow faster than the average for all occupations be-

cause of increasing reliance on electrocardiographs to diagnose heart diseases and for physical examinations of older patients. Also contributing to the expected growth of this occupation is the increased demand for health services in general, as a result of greater health consciousness, new medical techniques and drugs, and extension of prepayment programs that make it easier for people to pay for health and medical care.

In addition to openings from growth, workers will be needed to replace technicians who die, retire, or leave the field for other reasons.

Earnings and Working Conditions

EKG technicians in hospitals and medical centers earned starting salaries of about $6,900 a year in 1976, according to a survey conducted by the University of Texas Medical Branch. Experienced EKG technicians, in some cases, earned as much as $13,700 a year.

Inexperienced EKG technicians with the Federal Government earned $6,572 a year in 1977; a few experienced technicians earned as much as $12,093 a year. Usually, EKG technicians earn about as much as the average for all nonsupervisory workers in private industry, except farming.

In general, those EKG technician with previous formal training earn higher starting salaries than those who learn on the job.

EKG technicians in hospitals receive the same fringe benefits as other hospital personnel, including hospitalization, vacation, and sick leave benefits. Some institutions provide tuition assistance or free education courses, pension programs, and uniforms. Technicians generally work a 40-hour week, which may include Saturdays and Sundays.

Sources of Additional Information

Local hospitals can supply information about employment opportunities. For additional information about the work of EKG technicians, contact:

American Hospital Association, 840 North Lake Shore Dr., Chicago, Ill. 60611.

Miss Ruth Jackson, President, American Cardiology Technologists Association, Scott and White Clinic, Temple, Tex. 76501.

ELECTRO-ENCEPHALOGRAPHIC TECHNOLOGISTS AND TECHNICIANS

(D.O.T. 078.368)

Nature of the Work

The field of electroencephalography (EEG) is concerned with recording and studying the electrical activity of the brain. A special instrument, the electroencephalograph, records this activity, producing a written tracing of the brain's electrical impulses. This record of brain waves is called an electroencephalogram.

Various kinds of brain disease can be diagnosed by neurologists and other qualified medical practitioners with the use of EEG. Electroencephalograms are taken for patients suspected of having brain tumors, strokes, or epilepsy. The consequences of infectious diseases on the brain can be measured with EEG. Electroencephalograms may be taken of children with serious adjustment problems or learning difficulties to discover any organic basis for these problems. EEG also may be used prior to vital organ transplant operations, to help determine whether the potential donor is dead or alive.

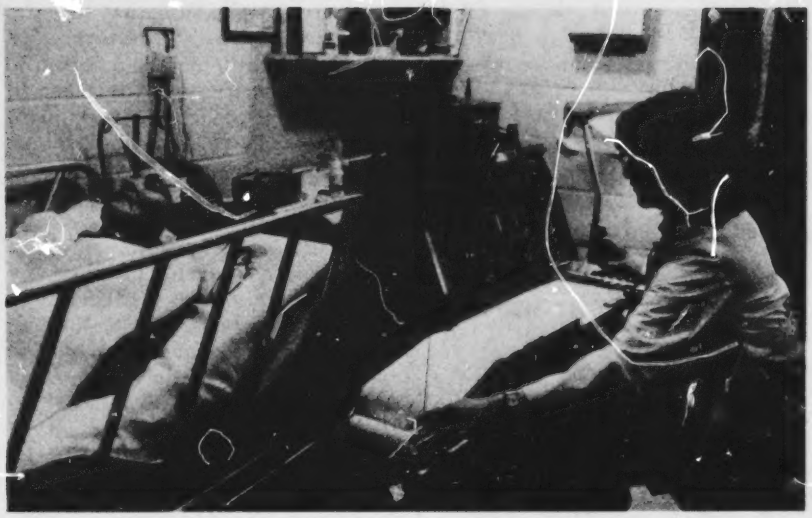
The people who operate EEG machinery are known as EEG technicians and technologists. The main job of an EEG technician is to produce electroencephalograms, under the supervision of an EEG technologist or an electroencephalographer (a physician specializing in electroencephalography). Before doing this job, the technician takes a simplified medical history of the patient and helps the patient relax for the test. The technician then applies the electrodes of the electroencephalograph to designated spots on the patient's head and makes sure that the machine is working well. The technician chooses the most appropriate combinations of instrument controls and electrodes to produce the kind of record needed. EEG technicians must be able to recognize and correct any artifacts that appear (an artifact is an electrical or mechanical event that comes from somewhere other than the brain). If there are any mechanical proolems with the electroencephalograph, the technician must advise his or her supervisor, so that the machine can be repaired promptly. EEG technicians also need a basic understanding of the kinds of medical emergencies that can occur in laboratories, to be able to react properly if an emergency arises. For example, if a patient suffers an epileptic seizure, the EEG technician must take the proper action.

EEG technologists usually perform all the duties of EEG technicians, but have a more thorough understanding of all aspects of EEG work. Thus they can apply specific EEG techniques to the particular requirements of a patient. Technologists also may use EEG equipment in conjunction with other electrophysiologic monitoring devices, such as a tape recorder. They also can repair the equipment if it is not working properly. After producing an EEG recording, the technologist writes a descriptive report to accompany it for use by electroencephalographers.

Part of an EEG technologist's job is to supervise EEG technicians. Besides direct supervision during EEG recordings, this includes such things as arranging work schedules and teaching EEG techniques. Technologists often have administrative responsibilities, such as managing the laboratory, keeping records, scheduling appointments, and ordering supplies.

Places of Employment

About 4,300 persons worked as electroencephalographic technologists and technicians in 1976. Although EEG personnel work primarily in the neurology departments of hospitals, many work in private offices of neurologists and neurosurgeons.



The electroencephalograph records the electrical activity of the brain.

Training, Other Qualifications, and Advancement

Most EEG technicians working in 1976 were trained on the job by experienced EEG personnel. However, with advances in medical technology, electroencephalograph equipment has become increasingly more sophisticated, requiring technicians with more training.

The Council on Medical Education of the American Medical Association, in collaboration with the American Electroencephalographic Society, the American Medical Electroencephalographic Association, and the American Society of Electroencephalographic Technologists, has developed standards for educational programs to train EEG technologists and technicians. These standards recommend that programs last from 1 to 2 years and include laboratory experience as well as classroom instruction in neurology, anatomy, neuroanatomy, physiology, neurophysiology, clinical and internal medicine, psychiatry, and electronics and instrumentation. Programs may be carried on in colleges, junior colleges, medical schools, hospitals, and vocational or technical schools. There were nine AMA-approved training programs for EEG technologists and technicians in 1976.

EEG personnel who have 1 year of training and 1 year of laboratory experience, and who successfully complete a written and oral examination administered by the American Board of Registration of Electroencephalograph Technologists (ABRET), are designated "Registered EEG Technologist" (R.EEG.T.). Although not a general requirement for employment, registration by ABRET is acknowledgment of a technologist's qualifications, and makes better paying jobs easier to obtain.

Persons who want to enter this field should have manual dexterity, good vision, an aptitude for working with electronic equipment, and the ability to work with patients as well as with other members of the hospital team. High school students considering a career in this occupation should take courses in health, biology, and electronics.

Some EEG technicians in large hospitals advance to chief EEG technologist and have increased responsibilities in laboratory management and in teaching basic techniques to new personnel. Chief EEG technologists are supervised by an electroencephalographer, or a neurologist or neurosurgeon.

Employment Outlook

The employment of EEG technologists and technicians is expected to grow faster than the average for all occupations due to the increased use of EEG's in surgery and in diagnosing and monitoring patients with brain disease. Contributing to the overall increase in health services and the need for EEG technologists and technicians are greater health consciousness and more prepaid health programs. Registered EEG Technologists will have the best employment opportunities.

In addition to openings from growth, many openings will arise when workers retire or leave the field for other reasons.

Earnings and Working Conditions

Starting salaries of EEG technicians employed by hospitals and medical centers averaged $7,800 a year in 1976, according to a survey by the University of Texas Medical Branch. Starting salaries for Registered EEG Technologists were $1,000 to $2,000 higher. Top salaries of experienced EEG technicians ranged as high as $20,600 a year. Highly qualified technologists may earn more as teachers in special training situations or as supervisors of EEG laboratories.

Inexperienced EEG trainees employed by the Federal Government received $6,572 a year in 1977 but they could advance to as much as $11,047 a year. Usually, EEG technicians earn about as much as the average for all nonsupervisory workers in private industry, except farming.

EEG technologists and technicians in hospitals receive the same benefits as other hospital personnel, including hospitalization, vacation, and sick leave benefits. Some institutions may provide tuition assistance or free courses, pension programs, uniforms, and parking.

EEG technologists and technicians generally work a 40-hour week with little overtime, although some hospitals require a standby emergency service after hours and on weekends and holidays.

Sources of Additional Information

Local hospitals can supply information about employment opportu-

nities. Additional information is available from:

American Hospital Association, 840 North Lake Shore Dr., Chicago, Ill. 60611.

For general information about a career in the field of electroencephalography as well as information on registration with ABRET, contact:

Ms. Sandra Clenney, R. EEG T., EEG 005, Upham Hall, O.S.U. Hospital, Columbus, Ohio 43210.

EMERGENCY MEDICAL TECHNICIANS

(D.O.T. 354.374)

Nature of the Work

An automobile accident, a heart attack, a near drowning, an unscheduled childbirth, a poisoning, a gunshot wound—all of these situations demand urgent medical attention. Seeing medical emergencies like these handled on television has made millions of Americans aware of the crucial role played by emergency medical technicians (EMT's), sometimes called ambulance attendants.

A call from a dispatcher sends EMT's—who usually work in teams of two—to the scene of the emergency. Although speed is essential, the EMT's obey the traffic laws for the operation of emergency vehicles. They also must know the best route to take in the face of traffic, road construction, and weather conditions.

Upon arriving at the scene of the emergency, the driver parks the ambulance in a safe place to avoid accidents. If no police are present, bystanders may be enlisted to lend a hand. For instance, in the case of an automobile accident, bystanders can help control traffic by placing road flares, removing debris, and redirecting traffic.

EMT's first determine the nature and extent of the victims' illnesses or injuries and establish priorities for emergency medical care. Patients receive appropriate medical care, such as opening and maintaining an airway, restoring breathing, controlling bleeding, treating for shock, immobilizing fractures, bandaging, assisting in childbirth, managing mentally disturbed patients, and giving initial care to poison and burn victims.

EMT training stresses efficiency and confidence to reassure both patients and bystanders. EMT's try to handle patients correctly—not wasting any time nor working too hastily. When the situation requires, as in the case of possible epilepsy or diabetes, EMT's look for medical identification emblems that are clues to providing correct treatment.

When persons are trapped, such as in an automobile accident, EMT's face a double problem. First they must assess the victims' injuries and supply all possible emergency medical care and protection to the trapped persons. Then they must use the correct equipment and techniques to remove the victims safely. EMT's may request additional help or special rescue or utility services by radio or telephone from a dispatcher.

In case of death, EMT's notify the proper authorities and arrange for the protection of the deceased's property.

Often patients must be transported to a hospital. In such instances, EMT's place the patients on stretchers, lift them into the ambulance, and secure both the patients and the stretchers for the ride. EMT's choose the nearest hospital they consider best equipped and staffed to treat their patients. To assure prompt treatment upon arrival, EMT's report by radio directly to the hospital emergency department or the emergency dispatcher about the nature and extent of injuries or illness, the number of persons being transported, and the destination. They may ask for additional advice from the hospital's emergency medical staff.

On the way to the emergency department, EMT's constantly watch the patients to give additional care as needed or as directed by a physician with whom they have radio contact.

Upon arrival at the hospital, they help transfer the patients from the ambulance to the emergency department. They report their observations and care of the patients to the emergency department staff for diagnostic purposes and as a matter of record. If called upon, EMT's help the emergency department staff.

One of the duties of EMT's is to maintain a clean, well-equipped ambulance. After each run, EMT's replace the used linen, blankets, and other supplies, send the used items to be sterilized, and carefully check all equipment so that the ambulance is ready for the next trip. If they have carried patients who have contagious infection or have been exposed to radiation, they decontaminate the interior of the ambulance and report such calls to the proper authorities. EMT's make sure that the ambulance is in good operating condition by checking the gasoline, oil, tire pressure, lights, siren, heater, and communications equipment before their shift begins.

In addition to the basic EMT, whose work has been described, there are two other types of EMT's: EMT-Paramedics and EMT-Dispatchers. Working with radio communication under the direction of a physician, EMT-Paramedics may administer drugs, both orally and intravenously, and use more complex equipment, such as a defibrillator, than basic EMT's.

Although not dealing directly with emergency patients, EMT-Dispatchers nevertheless play an important role. They receive and process calls for emergency medical assistance. Dispatchers send the appropriate persons and resources to the emergency site and coordinate the movement of emergency medical vehicles from start to finish. By means of telephone and radio, dispatchers serve as a communications link between the appropriate medical facility and those who are sent to attend the emergency patients. EMT-Dispatchers also handle communications for public safety agencies, such as police and fire departments so that services like traffic and fire control can be performed.

Places of Employment

In 1976, an estimated 287,000 persons worked as EMT's. About half were volunteers on rescue squads, most of whom work closely with fire departments.

Many paid EMT's work for police and fire departments and private ambulance companies. Funeral homes providing ambulance service employ some EMT's, although in recent years many funeral homes have left this field. A few EMT's work on hospital-based ambulance squads.

Training, Other Qualifications, and Advancement

Few EMT's received formal training until recent years. Now instruction in emergency medical care techniques is mandatory. A standard training course is the 81-hour program designed by the U.S. Department of Transportation. This program, or its equivalent, is available in all 50 States and the District of Columbia. It is offered by police, fire, and health departments, in hospitals, and as a special course in medical schools, colleges, and universities.

This course provides instruction and practice in dealing with emergencies such as bleeding, fractures, airway obstruction, cardiac arrest, and emergency childbirth. Students learn to use and care for common emergency equipment, such as backboards, suction machines, fracture kits, oxygen delivery systems, and stretchers. Physicians and nurses usually give the lectures and demonstrations.

After completing the basic 81-hour program, students may take a 2-day course dealing with the removal of trapped victims. Further training courses presently are being prepared by the Department of Transportation for the categories of EMT-Paramedic and EMT-Dispatcher. A special course on driving also is in preparation. Thus, a career ladder for the EMT field is being established.

Admittance to an EMT training course requires that the applicant be at least 18 years old, have a high school diploma or the equivalent, and have a valid driver's license. Among high school subjects recommended for persons interested in the field are driver education and health and science courses. Training in the Armed Forces as a "medic" also is considered good preparation for prospective EMT's.

Graduates of approved EMT training programs who meet certain experience requirements and successfully pass a written and practical examination administered by the National Registry of Emergency Medical Technicians earn the title of Registered EMT-Ambulance. To maintain their proficiency, EMT's must register again every 2 years.

Although not a general requirement for employment, registration with the National Registry is acknowledgement of an EMT's qualifications and makes higher paying jobs easier to obtain. By late 1976, nearly 70,000 EMT's were registered.

EMT's should have good dexterity and physical coordination. They must be able to lift and carry up to 100 pounds. EMT's need good eyesight (eyeglasses may be used) with accurate color vision. Normal good health is expected.

Because EMT's often work under trying conditions, they must exercise good judgment under stress and have leadership ability. Emotional stability and the ability to adapt to many different situations help them handle difficulties. They should have a neat and clean appearance and a pleasant personality.

Employment Outlook

Employment of EMT's is expected to grow much faster than the average for all occupations, due to the increasing public awareness of the need for better emergency medical services. Since passage of the Highway Safety Act of 1966 and the Emergency Medical Services System Act of 1973, the Federal Government has encouraged the expansion and improvement of ambulance services.

Additional positions for full-time EMT's will become available as more and more communities change from volunteer to paid ambulance serv-

EMT training stresses efficiency and confidence to reassure patients and bystanders.

ices. A trend is underway establishing ambulance service as the third essential community service, after police and fire protection.

Increasing cooperation between ambulance personnel and the physicians and nurses of emergency departments is expected to further contribute to the growth of the emergency medical technician occupation. As the field of emergency medical care develops and personnel become more qualified, more people are expected to use ambulance services, which will increase the demand for EMT's.

In addition to job opportunities created by growth, many openings for EMT's will occur each year because of the need to replace EMT's who retire, die, or leave the labor force for other reasons.

Earnings and Working Conditions

Earnings of EMT's depend on the type of employer, the training and experience of the individual, and the geographic location.

In general, graduates of approved 81-hour training programs received starting salaries of between $7,500 and $9,000 annually in 1976, depending on the community. EMT's working for police and fire departments usually are paid the same salaries as police officers and firefighters. (See statement on police officers and firefighters elsewhere in the *Handbook*.)

A few volunteer EMT's are paid a small amount for being on call or answering emergency calls.

EMT's employed by fire departments often have a 56-hour workweek. Those employed by hospitals, private firms, and police departments usually work 40 hours a week. Volunteer EMT's have varied work schedules, but many put in from 8 to 12 hours a week. Because many ambulance services function 24 hours a day, EMT's often work nights and weekends.

The employee benefits offered by private companies, such as vacation, sick leave, and health insurance, vary widely. EMT's employed by hospitals and police and fire departments receive the same benefits as the other employees.

Sources of Additional Information

Information concerning training courses can be obtained by writing to the Emergency Medical Services Division of the Health Department of your State.

For information about job opportunities for prospective EMT's in your State, contact the Governor's Office for Highway Safety

Information about the registration of EMT's is available upon request from:

National Registry of Emergency Medical Technicians, 1395 East Dublin-Granville Rd., P.O. Box 29233, Columbus, Ohio 43229.

MEDICAL LABORATORY WORKERS

(D.O.T. 078.128, .168, .281, and .381)

Nature of the Work

Laboratory tests play an important part in the detection, diagnosis, and treatment of many diseases. Medical laboratory workers, often called clinical laboratory workers, include three levels: medical technologists, technicians, and assistants. They perform tests under the general direction of pathologists (physicians who diagnose the causes and nature of disease) and other physicians, or scientists who specialize in clinical chemistry, microbiology, or the other biological sciences. Medical laboratory workers analyze the blood, tissues, and fluids in the human body by using precision instruments such as microscopes and automatic analyzers.

Medical technologists, who require 4 years of postsecondary training, perform complicated chemical, microscopic, and bacteriological tests. These may include chemical tests to determine, for example, the blood cholesterol level, or microscopic examination of the blood to detect the presence of diseases such as leukemia. Technologists microscopically examine other body fluids; make cultures of body fluid or tissue samples to determine the presence of bacteria, parasites, or other microorganisms; and analyze the samples for chemical content or reaction. They also may type and cross-match blood samples.

Technologists in small laboratories often perform many types of tests. Those in large laboratories usually specialize in areas such as microbiology, parasitology, biochemistry, blood banking, hematology (the study of blood cells), and nuclear medical technology (the use of radioactive isotopes to help detect diseases).

Most medical technologists conduct tests related to the examination and treatment of patients and are called on to display independent judgment. Some do research, develop laboratory techniques, teach, or perform administrative duties.

Medical laboratory technicians, who generally require 2 years of postsecondary training, perform a wide range of tests and laboratory procedures that require a high level of skill but not the in-depth knowledge of highly trained technologists. Like technologists, they may work in several areas or specialize in one field.

Medical laboratory assistants, who generally have a year of formal training, assist medical technologists and technicians in routine tests and related work that can be learned in a relatively short time. In large laboratories, they may concentrate in one area of work. For example, they may identify abnormal blood cells on slides. In addition to performing routine tests, assistants may store and label plasma; clean and sterilize laboratory equipment, glassware, and instruments; prepare solutions following standard laboratory formulas and procedures; keep records of tests; and identify specimens.

Places of Employment

About 240,000 persons worked as medical laboratory workers in 1976. Most medical laboratory personnel work in hospital laboratories. Others

work in independent laboratories, physicians' offices, clinics, public health agencies, pharmaceutical firms, and research institutions. These places are concentrated in larger cities and populous States.

In 1976, Veterans Administration hospitals and laboratories employed about 2,400 medical technologists and about 2,000 medical laboratory technicians and assistants. Others worked for the Armed Forces and the U.S. Public Health Service.

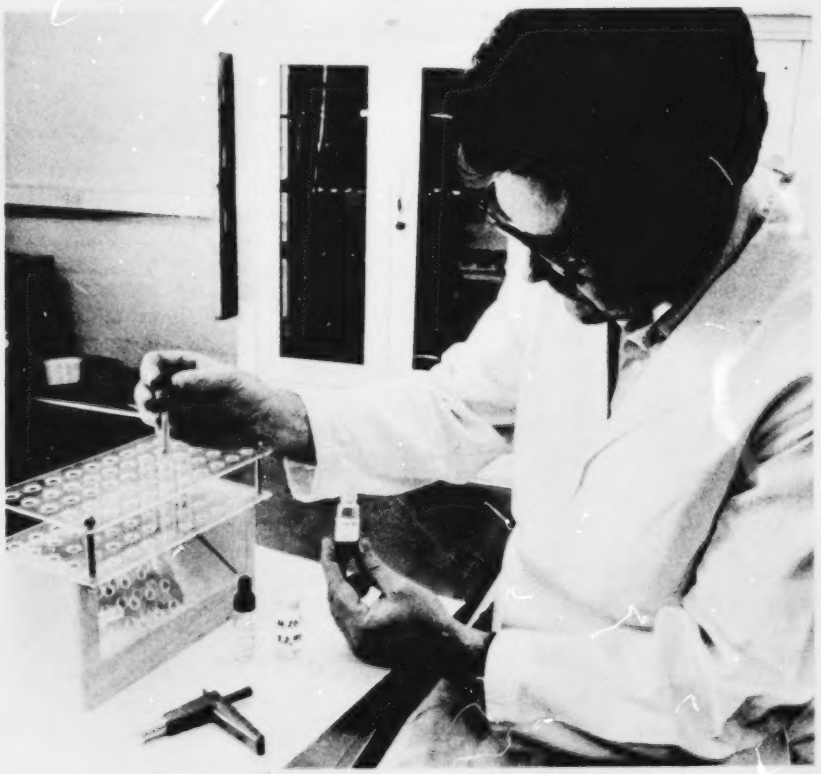
Training, Other Qualifications, and Advancement

The minimum educational requirement for a beginning job as a medical technologist usually is 4 years of college training including completion of a specialized training program in medical technology.

Undergraduate work includes courses in chemistry, biological sciences, and mathematics. These studies give the technologist a broad understanding of the scientific principles underlying laboratory work. Specialized training usually requires 12 months of study and includes extensive laboratory work. In 1976, about 700 hospitals and schools offered programs accredited by the American Medical Association. These programs were affiliated with colleges and universities; a bachelor's degree usually is awarded upon completion. A few programs require a bachelor's degree for entry.

Many universities also offer advanced degrees in medical technology and related subjects for technologists who plan to specialize in a certain area of laboratory work or in teaching, administration, or research.

Medical laboratory technicians employed in 1976 got their training in a variety of educational settings. Many attended junior or 4-year colleges and universities for 2 years. Some were trained in the Armed Forces. Many technicians received training in private or nonprofit vocational and technical schools. In 1976 the American Medical Association accredited 38 of these programs and the Accrediting Bureau of Medical Laboratory Schools accredited 36.



Most medical laboratory personnel work in hospitals.

Most medical laboratory assistants employed in 1976 were trained on the job. In recent years, however, an increasing number have studied in 1-year training programs conducted by hospitals, junior colleges in cooperation with hospitals, or vocational schools. In 1976, the American Medical Association accredited 153 training programs for medical laboratory assistants. Applicants to these programs should be high school graduates or have an equivalency diploma with courses in science and mathematics. The programs include classroom instruction and practical training in the laboratory. They often begin with a general orientation to the clinical laboratory followed by courses in bacteriology, serology, parasitology, hematology, clinical chemistry, blood banking, and urinalysis.

After the successful completion of the appropriate examinations, medical technologists may be certified as Medical Technologists, MT (ASCP), by the Board of Registry of the American Society of Clinical Pathologists; Medical Technologists, MT, by the American Medical Technologists; or Registered Medical Technologists, RMT, by the International Society of Clinical Laboratory Technology. These organizations also certify technicians. Laboratory assistants are certified by the American Society of Clinical Pathologists.

Medical technologists and technicians must be licensed in Alabama, California, Florida, Georgia, Hawaii, Illinois, Nevada, Pennsylvania, Tennessee, New York City, and Puerto Rico. Requirements for licensure include a written examination in some States.

Accuracy, dependability, and the ability to work under pressure are important personal characteristics for a medical laboratory worker. Manual dexterity and normal color vision are highly desirable.

Persons interested in medical laboratory careers should use considerable care in selecting a training program. They should get information about the kinds of jobs obtained by graduates, educational costs, the ac-

creditation of the school, the length of time the training program has been in operation, instructional facilities, and faculty qualifications.

Technologists may advance to supervisory positions in certain areas of laboratory work, or, after several years' experience, to administrative medical technologist in a large hospital. Graduate education in one of the biological sciences, chemistry, management, and education usually speeds advancement. Technicians can advance to technologists by getting additional education and experience. Similarly, assistants can become technicians by acquiring more education and experience.

Employment Outlook

Employment opportunities for medical laboratory workers are expected to be favorable through the mid-1980's. Employment of these workers is expected to expand faster than the average for all occupations as physicians make wider use of laboratory tests in routine physical checkups and in the diagnosis and treatment of disease. Indirectly influencing growth in the field are population growth, greater health consciousness, and expansion of prepayment programs for medical care that make it easier for people to pay for services.

The use of automated laboratory test equipment is expected to lead to an increase in the number of medical laboratory technicians and assistants relative to technologists. Through technological advances, technicians and assistants can operate equipment to perform tests which previously required the skill of a technologist.

Technologists will be needed to fill supervisory positions in all laboratories. Also, some will be needed in laboratories where they are required by State licensing authorities or third-party health insurance regulations, and in laboratories not using the new automated equipment.

In addition to openings resulting from growth, many jobs will become available each year because of the need to replace medical laboratory workers who die, retire, or leave the field for other reasons.

Earnings and Working Conditions

Salaries of medical laboratory workers vary depending on the employer and geographic location. In general, medical laboratory workers employed on the West Coast and in large cities received the highest salaries.

Starting salaries for medical technologists in hospitals and medical centers averaged about $10,600 a year in 1976, according to a survey conducted by the University of Texas Medical Branch. Beginning salaries for laboratory technicians averaged about $8,700 a year in 1976; for assistants, about $7,600.

The Federal Government paid newly graduated medical technologists with bachelor's degrees starting salaries of $9,303 a year in 1977. Those having experience, superior academic achievement, or a year of graduate study entered at $11,523. The Federal Government paid medical laboratory assistants and technicians starting salaries ranging from $5,810 to $9,303 a year in 1977, depending on the amount and type of education and experience. Medical technologists in the Federal Government averaged $13,600 a year and medical technicians $11,800 a year, in 1977.

Medical laboratory personnel generally work a 40-hour week. In hospitals, they can expect some night and weekend duty. Hospitals normally provide vacation and sick leave benefits; some have retirement plans.

Laboratories generally are well-lighted and clean. Although unpleasant odors and specimens of many kinds of diseased tissue often are present, few hazards exist if proper methods of sterilization and handling of specimens, materials, and equipment are used.

Sources of Additional Information

Information about education and training for medical technologists, technicians, and laboratory assistants meeting standards recognized by the American Medical Association, the U.S. Office of Education, or both, as well as career information on these fields of work, is available from:

American Society of Clinical Pathologists, Board of Registry, P.O. Box 4872, Chicago, Ill. 60680.

American Society for Medical Technology, 5555 W. Loop South, Bellaire, Tex. 77401.

American Medical Technologists, 710 Higgins Rd., Park Ridge, Ill. 60068.

Accrediting Bureau of Medical Laboratory Schools, Oak Manor Office, 29089 U.S. 20 West, Elkhart, Ind. 46514.

For information about other technician training programs, contact:

International Society for Clinical Laboratory Technology, 805 Ambassador Building, 411 N. Seventh St., St. Louis, Mo. 63101.

For a list of training programs for medical technologists, technicians, and assistants that are approved by the American Medical Association, write:

Department of Allied Health Evaluation, American Medical Association, 535 North Dearborn St., Chicago, Ill. 60610.

For a list of training programs for medical laboratory technicians accredited by the Accrediting Bureau of Medical Laboratory Schools, write:

Secretary-ABMLS, 29089 U.S. 20 West, Elkhart, Ind. 46514.

Information about employment opportunities in Veterans Administration hospitals is available from the Office of Personnel (05-E), Veterans Administration, Washington, D.C. 20420.

Information about clinical and research employment opportunities with the National Institutes of Health is available from the Clinical Center, National Institutes of Health, Bethesda, Maryland 20014.

MEDICAL RECORD ADMINISTRATORS

(D.O.T. 100.388)

Nature of the Work

All health care institutions keep records that contain medical information on each patient, including case histories of illnesses or injuries,

reports on physical examinations, X-rays and laboratory tests, doctors' orders and notes, and nurses' notes. These records are necessary for correct and prompt diagnosis and treatment of illnesses and injuries. They also are used for research, insurance claims, legal actions, evaluation of treatment and medications prescribed, and in the training of medical personnel. Medical information in hospitals also is used to evaluate patient care provided in the hospital and as a basis for health care planning for the community.

Medical record administrators direct the activities of the medical record department and develop systems for documenting, storing, and retrieving medical information. They supervise the medical record staff, which processes and analyzes records and reports on patients' illnesses and treatment. They train members of the medical record staff for specialized jobs, compile medical statistics required by State or national health agencies, and assist the medical staff in evaluations of patient care or research studies. Medical record administrators serving as department heads are a part of the hospital management staff and participate fully in management activities. As the administrators responsible for the medical information system, they may be required to testify in court about records and record procedures.

The size and type of institution affect the duties and amount of responsibility assigned to medical record administrators. In large hospitals, chief medical record administrators supervise other medical record administrators, technicians, and clerks. Smaller hospitals may employ only two or three persons in the medical record department; in nursing homes usually one person keeps the medical records. In these cases a consulting medical record administrator usually advises technical and clerical personnel performing medical record functions.

Places of Employment

Most of the 12,300 medical record administrators employed in 1976 worked in hospitals. The remainder worked in clinics, nursing homes, State and local public health departments, and medical research centers. Some health insurance companies also employ medical record administrators to help determine liability for payment of their clients' medical fees. Some medical record administrators work for firms that manufacture equipment for recording and processing medical data and develop and print health insurance and medical forms. Many small health care facilities hire medical record administrators as consultants.

Medical record administrators develop systems for documenting, storing, and retrieving medical information.

Training, Other Qualifications, and Advancement

Preparation for a career as a medical record administrator is offered in specialized programs in colleges and universities. Most programs last 4 years and lead to a bachelor's degree in medical record administration. However, concentration in medical record administration begins in the third or fourth year of study, making transfer from a junior college possible. One-year certificate programs also are available for those who already have a bachelor's degree and required courses in the liberal arts and biological sciences. In 1977, there were 41 programs in medical record administration approved by the Council on Medical Education of the American Medical Association and the American Medical Record Association (AMRA). High school courses that are useful include health, business administration, mathematics, and biology.

Training for medical record administrators includes both classroom instruction and practical experience. Anatomy, physiology, fundamentals of medical science, medical terminology, and medical record science are among the required scientific courses. In addition, management courses such as hospital organization and administration, health law, statistics, data processing, and computer science are part of the curriculum. Experience in the medical record departments of hospitals provides students with a practical background in applying standardized medical record practices, compiling statistical reports, analyzing data, and organizing medical record systems.

Graduates of approved schools in medical record administration are eligible for the national registration examination given by AMRA. Pass-

ing this examination gives professional recognition as a Registered Record Administrator (RRA). There were about 5,000 employed RRA's in 1976, according to AMRA.

Medical record administrators must be accurate and interested in detail. They also must be able to communicate clearly in speech and writing. Because medical records are confidential, medical record administrators must be discreet in processing and releasing information. Supervisors must be able to organize and analyze work procedures and to work effectively with other hospital personnel.

Medical record administrators with some experience in smaller health facilities may advance to positions as department heads in large hospitals or to higher level positions in hospital administration. Some coordinate the medical record departments of several small hospitals. Others move on to medical record positions in health agencies. Many teach in the expanding programs for medical record personnel in 2- and 4-year colleges and universities.

Employment Outlook

Employment opportunities for graduates of approved medical record administrator programs are expected to be good through the mid-1980's. Employment is expected to grow faster than the average for all occupations, with the increasing use of health facilities as more and more people are covered by health insurance. The detailed information required by third-party payers such as insurance companies and Medicare also will cause growth in the occupation. More consultants will be needed to standardize health records in outpatient clinics, community health centers, nursing homes, and home care programs. The importance of medical records in research and the growing use of computers to store and retrieve medical information also should increase the demand for qualified medical record administrators to develop new medical information systems. Part-time employment opportunities also should be available in teaching, in research, and in consulting work for health care facilities.

Earnings and Working Conditions

The salaries of medical record administrators are influenced by the location, size, and type of employing institution, as well as by the duties and responsibilities of the position. The average starting salary for medical record administrators in 1976 was $12,312 a year, according to a national survey conducted by the University of Texas Medical Branch at Galveston. Top salaries averaged $14,916 a year, with some earning as much as $27,612.

Newly graduated medical record administrators employed by the Federal Government generally started at $9,303 a year in 1977; those having bachelor's degrees and good academic records were eligible to begin at $11,523. In 1977, the Federal Government paid experienced medical record administrators average salaries of $15,700 a year.

Medical record administrators usually work a regular 36- to 40-hour week and receive paid holidays and vacations.

Sources of Additional Information

Information about approved schools and employment opportunities is available from:

American Medical Record Association, John Hancock Center, Suite 1850, 875 N. Michigan Ave., Chicago, Ill. 60611.

MEDICAL RECORD TECHNICIANS AND CLERKS

(D.O.T. 249.388)

Nature of the Work

A medical record is a permanent report on a patient's condition and course of treatment in a hospital, clinic, or other health care institution. Physicians, allied health personnel, hospital administrators, public health authorities, and insurance companies rely on these records which are kept by important members of the health care staff known as medical record technicians and clerks.

Medical record technicians and clerks perform the functions essential to maintaining the medical information system including transcription of medical data, analysis and coding of information, filing, maintenance of registries, compiling of statistics, and abstracting records.

The system used in hospitals to gather, preserve, and maintain the information for medical records requires the teamwork of many medical record technicians and clerks. In large hospitals, recordkeeping activities are supervised and coordinated by a medical record administrator, but in smaller hospitals, experienced medical record technicians often manage the department. In most nursing homes, a medical record clerk, working under the supervision of a medical record consultant who is a Registered Record Administrator (RRA) or an Accredited Record Technician (ART), is responsible for the medical records.

Medical record clerks perform routine clerical tasks that require a minimum of specialized knowledge. They assemble the information for the records in sequence; check to see that all necessary forms, signatures, and dates are present; and locate any previous medical records that may be on file for the patient. They translate selected information such as sex, age, and referral source into a code and enter it on the records. Medical record clerks answer routine staff requests for information about patients and gather statistics for reports to various groups such as State health departments. Some medical record clerks transcribe reports of operations, X-ray and laboratory examinations, and special treatments given to patients.

Medical record clerks follow the explicit instructions and guidelines of their supervisors. Person-to-person contacts in hospitals are limited to providing readily available, nontechnical information to the hospital staff. However, in small nursing

Analyzing records and cross-indexing medical information make up a large part of the technician's work.

homes where only one medical record clerk is employed, there is much personal contact with the patients as well as with fellow staff members.

Beginning medical record technicians perform duties that may be similar to those of clerks but which require more technical knowledge. The technician codes the diseases, operations, and special therapies according to recognized classification systems and enters the codes on the medical record. This coding makes it easier to refer to the record when there is a need to review the patient's case or to collect data for other purposes. Analyzing records and cross-indexing medical information make up a large part of the technician's work. Technicians do the important job of reviewing records for completeness, accuracy, and compliance with requirements, referring incomplete records to the person who compiled them. They review records for internal consistency and point out to their supervisors any apparent errors.

Technicians obtain information from records in answer to legal, governmental, and insurance company inquiries in duly authorized instances, and gather statistics and prepare periodic reports for health care facilities on types of diseases treated, types of surgery performed, and utilization of hospital beds. They also supervise medical record clerks, assist the medical staff by preparing special studies and tabulating data from records for research, and take records to court.

Placement and Employment

In 1976, there were about 16,000 medical record technicians and 41,000 clerks. Although most work in hospitals, a growing number are finding jobs in clinics, nursing homes, community health centers, governmental agencies, consulting firms, and health maintenance organizations. Some medical record technicians are consultants to small health facilities. Some insurance companies employ experienced medical record technicians to collect information from patients' records to determine liability for payment. Public health departments hire medical record technicians to supervise data collection from health care institutions and to assist in research to improve health care. Manufacturers of medical record systems, services, and equipment also employ medical record personnel to help develop and market their products.

Training, Other Qualifications, and Advancement

Most employers prefer to fill technician positions with graduates from one of the colleges that have been accredited by the American Medical Association (AMA) and the American Medical Record Association (AMRA). These colleges have 2-year associate degree programs. In 1977, there were 66 such programs available. Required courses included biological sciences, medical terminology, medical record science, business management, and secretarial skills. Persons with this training who also have passed the Accredited Record Technician (ART) examination can enter the medical record field as technicians, and can often look forward to promotion to supervisory positions.

High school graduates who have basic secretarial skills can enter the medical record field as beginning clerks. About 1 month of on-the-job training will prepare them for routine tasks that do not require much specialized skill. Although they are not required, high school courses in science, health, typing, mathematics, and office practice are helpful. Medical record personnel must be accurate and pay attention to detail.

The American Medical Record Association offers a correspondence course in medical transcription that can be taken either as a home study program or as in-service training. The certificate given upon the successful completion of the course is helpful in applying for a job as a medical record clerk. Medical terms and references learned provide a good foundation for advancement.

Some medical record clerks who have had several years of experience advance to the technician level through an approved education program, especially in areas where there is a shortage of trained medical record technicians. In the future, however, it will be increasingly difficult for clerks to become technicians without graduating from an accredited college in medical record technology. In addition, another AMRA correspondence course is available for experienced medical record clerks to prepare for the examination for accreditation as medical record technicians. Passing this examination and earning the title of ART can lead to promotion to higher paying and more responsible positions in medical records. In 1977, there were 9,240 ART's.

Employment Outlook

Employment of medical record technicians and clerks is expected to grow much faster than the average for all occupations through the mid-1980's. This employment growth will stem from a continued increase in the use of health insurance and Medicare and Medicaid, which will result in a need for more complete medical records. New jobs also will be created as nursing homes, clinics, and new types of health care facilities such as health maintenance organizations increasingly employ medical record personnel.

The outlook for technicians with a 2-year course will be favorable

through the mid-1980's. It is expected that medical record technicians will be required to have this specialized training in the future as more attention is given to documenting medical care in the records in order to improve medical care delivery. As a result, technicians who have not received formal training may experience strong competition for positions from medical record technicians who have an associate degree.

Earnings and Working Conditions

Earnings of medical record clerks and technicians vary greatly according to locality. Beginning medical record clerks earned an average of $7,150 annually in private hospitals in 1976. Earnings ranged from $5,500 in small hospitals in the South to $11,000 in New York City, according to limited data. In general, salaries are highest in the big cities and lowest in rural areas. Salaries usually are higher in larger hospitals and urban areas.

Salaries of medical record technicians follow a similar geographic pattern. Limited data indicate that, in 1976, the median annual salary for ART's was $11,000. Experienced technicians who were directors of hospital medical record departments averaged $11,550. Some earned over $13,200 a year.

In Federal hospitals, medical record clerks earned a beginning annual salary of $7,408 in 1977. Annual salaries of medical record technicians ranged from $8,316 to $14,979, depending on previous experience and training. Some outstanding medical record technicians may work up to higher supervisory positions with corresponding pay increases, although most of these positions are filled by Registered Record Administrators.

Like most hospital employees, medical record personnel work a 36- to 40-hour week, receive paid holidays and vacations, health and insurance benefits, and can participate in retirement plans. Although most of the positions are full time, some part-time jobs are available.

Sources of Additional Information

A list of approved schools for medical record technicians, facts about the correspondence courses for medical transcription and medical record personnel, and additional details on the work performed by medical record technicians are available from:

American Medical Record Association, John Hancock Center, Suite 1850, 875 N. Michigan Ave., Chicago, Ill. 60611.

OPERATING ROOM TECHNICIANS

(D.O.T. 079.378)

Nature of the Work

Operating room technicians, occasionally called surgical technicians, assist surgeons and anesthesiologists before, during, and after surgery.

They help set up the operating room with the instruments, equipment, sterile linens, and fluids such as glucose that will be needed during an operation. Operating room technicians also prepare patients for surgery by washing, shaving, and disinfecting body areas where the surgeon will operate. They may transport patients to the operating room and help drape and position them on the operating table.

During surgery, they pass instruments and other sterile supplies to the surgeons. They hold retractors, cut sutures, and help count the sponges, needles, and instruments used during the operation. Operating room technicians help prepare, care for, and dispose of specimens taken for testing during the operation and help apply dressings. They may operate sterilizers, lights, suction machines, and diagnostic equipment.

After the operation, operating room technicians help transfer patients to the recovery room and assist nurses in cleaning and stocking the operating room for the next operation.

Places of Employment

About 30,000 persons worked as operating room technicians in 1976. They worked in hospitals or other institutions that have operating room, delivery room, and emergency room facilities. In addition, many were members of the Armed Forces.

Training, Other Qualifications, and Advancement

Most operating room technicians are trained in vocational and technical schools, hospitals, and community and junior colleges. These training programs last from 9 months to 1 year; some junior college programs last 2 years and lead to an associate degree. Students receive classroom training as well as supervised clinical experience. Required courses include anatomy, physiology, and microbiology. Courses teaching practical applications include the care and safety of patients during surgery, use of anesthesia and its hazards, and nursing procedures. They also learn how to sterilize instruments, prevent and control infection, and handle special drugs, solutions, supplies, and equipment. In 1976, there were 46 training programs accredited by the American Medical Association.

Some operating room technicians are trained on the job. A high school education or the equivalent generally is required for entry into training and employment. On-the-job training programs in many hospitals include classroom instruction in the same type of courses taught in junior colleges and vocational schools. The length of these programs varies from 6 weeks to 1 year, depending on the trainee's qualifications and the objectives of the training given. Some hospitals prefer applicants who have worked as nursing aides or practical nurses.

Some operating room technicians receive training in the Armed Forces.

The Association of Operating Room Technicians awards a certificate to operating room technicians who pass their comprehensive examination. A Certified Operating Room Technician (CORT) is recognized as competent in the field and generally is paid a higher salary.

Operating room technician assists surgeons.

Manual dexterity is a necessity for operating room technicians because they must handle various instruments quickly. They must be orderly and emotionally stable. High school students interested in careers in this occupation are advised to take courses in health and biology.

Operating room technicians may advance to the positions of assistant operating room administrator and assistant operating room supervisor. Assistant operating room administrators deal with the administrative aspects of running an operating room, such as ordering supplies and arranging work schedules, while assistant operating room supervisors actually work in the operating room itself, directing other operating room technicians.

Employment Outlook

Employment opportunities for operating room technicians are expected to be good through the mid-1980's. Graduates of 2-year community and junior college programs should be especially in demand.

Employment in this field is expected to grow faster than the average for all occupations as operating room technicians increasingly assume more of the routine nursing tasks in the operating room. The same factors that contribute to the demand for health workers in general apply to operating room technicians—population growth and the increased ability of people to pay for medical care due to expansion in coverage under prepayment insurance programs.

In addition to job openings resulting from growth of the occupation, many new operating room technicians will be needed to replace workers who die, retire, or leave the field for other reasons.

Earnings and Working Conditions

The average starting salary for operating room technicians was about $7,400 a year in 1976, according to a national survey conducted by the University of Texas Medical Branch. Experienced technicians earned average salaries of approximately $9,300 annually. In 1977, the Federal Government paid operating room technicians starting salaries of $8,316 a year. Most experienced operating room technicians employed by the Federal Government received annual salaries of $10,370.

Graduates of training programs in hospitals and community and junior colleges often earn higher salaries than workers without formal training. Salaries, reflecting variations in the cost of living, also vary widely by geographic location, with those on the East and West Coasts generally higher. Usually, operating room technicians earn about as much as the average for all nonsupervisory workers in private industry, except farming.

Operating room technicians usually work a 5-day, 40-hour week. However, they may be required to work "on call" shifts (staying available to work on short notice).

Sources of Additional Information

Additional information on a career as an operating room technician and on training programs for the occupation is available from:

Association of Operating Room Technicians, Inc., 1100 West Littleton Blvd., Suite 201, Littleton, Colo. 80120.

Information on the operating room technician occupation also is available from:

American Medical Association, Department of Allied Health Evaluation, 535 North Dearborn St., Chicago, Ill. 60610.

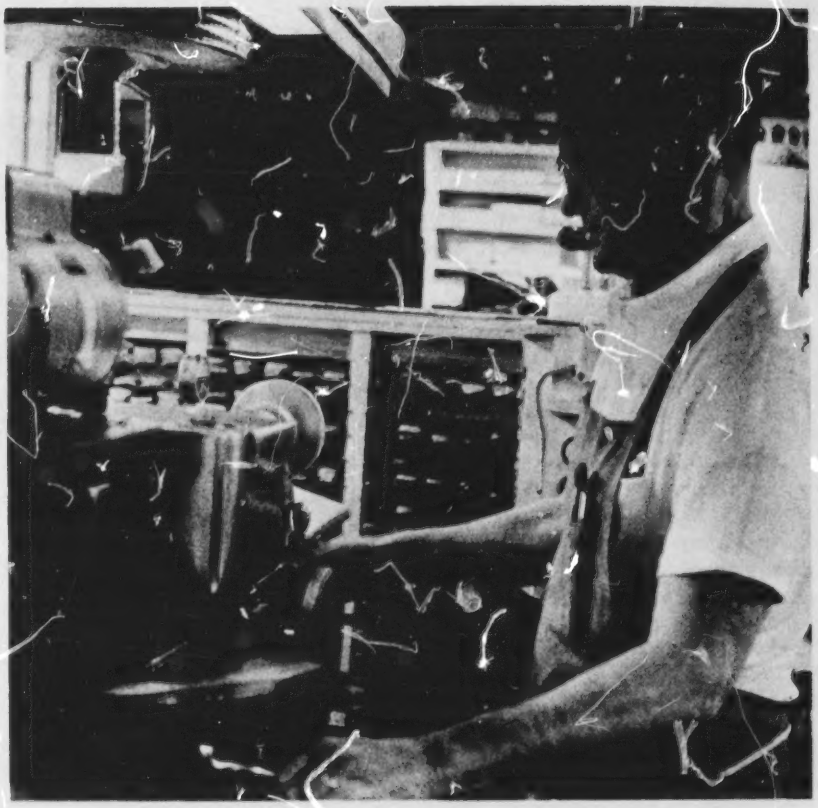
OPHTHALMIC LABORATORY TECHNICIANS

(D.O.T. 711.381 and 713.884)

Nature of the Work

Ophthalmic laboratory technicians (also called *optical mechanics*) make eyeglasses ordered by dispensing opticians, eye physicians (ophthalmologists), and optometrists. The two types of ophthalmic laboratory technicians are surfacer (or lens grinder) and bench technician (or finisher). In small laboratories, one person may perform the tasks of both a surfacer and a finisher. Starting with standard size lens blanks, which large optical firms mass-produce, they set up and operate machines to grind and polish eyeglass lenses according to prescription specifications. Surfacers use precision instruments to measure the lenses and make sure that they fit the prescription. In large laboratories, work is divided into separate operations which are performed mainly by workers who operate power grinding and polishing machines.

Bench technicians mark and cut lenses and smooth their edges to fit frames. They then assemble the lenses and frame parts into finished glasses. Bench technicians use special tools, such as lens cutters and glass drills, as well as small files, pliers, and other handtools. They also use automatic edging machines to shape lens edges and precision instruments to detect imperfections. In large laboratories, the duties of bench technicians are divided into several operations which are performed mainly by semiskilled workers.



Technician grinds lens to prescription specifications.

Places of Employment

About 22,000 persons worked as ophthalmic laboratory technicians in 1976. Most ophthalmic laboratory technicians work in ophthalmic laboratories. Some work for retail optical dispensaries or other stores that sell prescription lenses. A few work for eye physicians or optometrists who dispense glasses directly to patients.

Ophthalmic laboratory technicians are found in every State. However, employment is concentrated in large cities and in populous States.

Training, Other Qualifications, and Advancement

The vast majority of all ophthalmic laboratory technicians learn their skills on the job. At first, technician trainees do simple jobs such as processing lenses through a grinding machine. As they gain experience, they progress to other operations such as lens cutting and eyeglass assembly. When the trainees have acquired experience in all types of work, which usually takes about 3 years, they are considered all-round optical mechanics. Some technicians specialize in one type of job, such as surfacing or bench work. The training time required to become a specialist is less than that needed to become an all-round technician.

High school graduates also can prepare to become a technician through 3- to 4-year formal apprenticeship programs. Apprentices with exceptional ability may complete their training in a shorter period.

Most training authorities agree that technicians who learn as apprentices have more job opportunities and more opportunities for advancement than those without such training.

Apprentices are generally trained to be either ophthalmic surfacers or finishers. All apprentices receive instruction in optical mathematics and optical physics. Ophthalmic surfacers receive training in lens grinding and ophthalmic finishers learn to assemble eyeglasses into frames and to do frame repair.

Some technicians receive training while in the Armed Forces or by attending vocational schools which offer 9-month full-time optical technician courses. Graduates from these types of programs generally need additional on-the-job training.

Employers prefer applicants for entry jobs as ophthalmic laboratory technicians to be high school graduates who have had courses in the basic sciences. A knowledge of physics, algebra, geometry, and mechanical drawing is particularly valuable. Interest in and ability to do precision work are essential.

Some States require licenses for ophthalmic laboratory technicians. To obtain a license, the applicant generally must meet certain minimum standards of education and training, and must also pass either a written or practical examination, or both. For specific requirements, the licensing boards of individual States should be consulted.

Ophthalmic laboratory technicians can become supervisors and managers. Some technicians become dispensing opticians, although the trend is to train specifically for optician jobs. Some technicians, especially those receiving their training in both shop and dispensing work, may go into business for themselves.

Employment Outlook

Employment of ophthalmic laboratory technicians is expected to increase faster than the average for all occupations through the mid-1980's. In addition to the job openings from employment growth, some openings will arise from the need to replace experienced workers who retire, die, or leave the occupation for other reasons.

More technicians will be needed due to the rising demand for eyeglasses. The demand for eyeglasses is expected to increase as a result of increases in population and a greater awareness of the need for eyeglasses. State programs to provide eye care for low-income families, union health insurance plans, and Medicare also will stimulate demand. Moreover, the growing variety of frame styles and colors may encourage individuals to buy more than one pair of glasses.

Earnings and Working Conditions

Hourly wage rates for ophthalmic technicians ranged from $4.60 to $7.50 in 1976, based on information from a small number of union contracts.

Apprentices start at about 60 percent of the skilled worker's rate; their wages are increased periodically so that upon completion of the apprenticeship program, they receive the beginning rate for experienced workers.

Most ophthalmic laboratory technicians work a 5-day, 40-hour week.

Work surroundings of the ophthalmic technician are pleasant, well-lighted, and well-ventilated, but noisy because of the power-grinding and polishing machines.

Some ophthalmic laboratory technicians are members of unions. The principal union in this field is the International Union of Electrical, Radio and Machine Workers (AFL-CIO).

Sources of Additional Information

A list of schools offering courses for people who wish to become ophthalmic laboratory technicians is available from:

National Academy of Opticianry, 514 Chestnut St., Big Rapids, Mich. 49307.

National Federation of Opticianry Schools, 300 Jay St., Brooklyn, N.Y. 11202.

For general information about the occupation, contact:

International Union of Electrical, Radio and Machine Workers, 1126 16th St. NW., Washington, D.C. 20036.

Opticians Association of America, 1250 Connecticut Ave. NW., Washington, D.C. 20036.

OPTOMETRIC ASSISTANTS

Nature of the Work

Optometric assistants perform a wide variety of tasks, allowing optometrists to devote more time to their professional duties. They keep patients' records, schedule appointments, and handle bookkeeping, correspondence, and filing. They prepare patients for eye examinations, take initial case histories, and record the results of optometrists' examinations. Optometric assistants measure patients for correct and comfortable fit of glasses. They suggest size and shape of eyeglass frames to compliment the patient's facial features, and adjust finished eyeglasses by heating, shaping, and bending the plastic or metal frames. They also assist the optometrist in giving instructions on the wear and care of contact lenses.

Optometric assistants help patients with exercises for eye coordination to overcome focusing defects. In the laboratory, they adjust conventional glasses to assure proper fit, insert lenses in frames, repair frames, keep an inventory of optometric materials, and clean and care for the instruments.

In a large optometric complex, assistants may specialize in visual training, chairside assistance, or office administration. In a smaller practice, they may perform all these duties.

Places of Employment

About 11,800 persons, worked as optometric assistants in 1976. Most worked for optometrists in private practice. Others worked for health clinics. Some served as assistants to optometrists in the Armed Forces.

Training, Other Qualifications, and Advancement

Most optometric assistants are trained on the job in their employers' offices. Training also can be acquired in 1-year academic courses; 11 schools offered this type of training in 1976. More detailed training in the technical aspects of optometry was available in 20 schools that offered 2-year courses leading to an associate degree. In addition, the U.S. Air Force trained optometric specialists in an accelerated, 16-week training program.

High school graduation or its equivalent, including courses in mathematics and office procedures, is a preferred background for admission to a formal training program or on-the-job training. All of the formal programs offer specialized courses such as the anatomy and physiology of the human eye, vision training (the use of exercises to correct defective vision), and contact lens theory and practice. Programs also include courses in secretarial and office procedures. Lectures and laboratory work are supplemented by actual experience in optometric clinics and practices.

Although most newly hired optometric assistants currently are trained on-the-job, optometrists prefer to hire assistants who are graduates of 1- or 2-year formal training programs. This training will become more important in gaining initial employment and advancement as more programs become available.

Manual dexterity and accuracy are requirements for persons planning to become optometric assistants. Because of the person-to-person work relationship between optometric assistants and patients, a neat appearance, courtesy, and tact are important qualifications.

Employment Outlook

The employment of optometric assistants is expected to grow faster than the average for all occupations through the mid-1980's. Employment opportunities for optometric assistants who have completed one of the formal training programs should be excellent. On-the-job training, however, probably will continue to be the means by which many persons enter the occupation. Many opportunities for part-time work will continue to be available.

Factors underlying the expected growth of the occupation are the increase in population and greater demand for eye care services. As the number of patients served by optometrists increase, more trained assistants will be needed.

Earnings and Working Conditions

Earnings of optometric assistants vary by geographical region, academic and technical qualifications, and the size and type of practice of the optometrists employing them. In 1976, beginning salaries ranged from $100 a week for optometric assistants having no training or experience to $160 a week for experienced and highly trained assistants, according to limited information available.

Most optometric assistants work between 30 and 40 hours a week. Occasionally they may work a few hours on Saturday. The work is not strenuous and physical surroundings are usually pleasant.

Sources of Additional Information

Further information on a career as an optometric assistant and a list of training programs are available from:

American Optometric Association, 7000 Chippewa St., St. Louis, Mo. 63119.

Most optometric assistants are trained on the job in their employers' offices.

RADIOLOGIC (X-RAY) TECHNOLOGISTS

(D.O.T. 078.168 and .368)

Nature of the Work

Bone fractures, ulcers, blood clots, and brain tumors are just a few of the medical problems that involve the use of X-rays in their treatment, either for diagnosis or therapy. X-rays are also taken of the chest during routine medical checkups to detect the presence of lung diseases in the early stages. The people who operate

X-ray equipment and take X-ray pictures (known as radiographs) are called radiologic technologists. They usually work under the supervision of radiologists—physicians who specialize in the use of X-rays.

Within the field of radiologic technology there are three specialties. The most widely known is X-ray technology, taking X-rays of parts of the human body for study by a radiologist in diagnosing a patient's problem. The other two branches are nuclear medicine technology—the application of radioactive material to help radiologists diagnose or treat illnesses or injuries—and radiation therapy, the use of radiation-producing machines to give therapeutic treatments recommended by radiologists. Radiologic technologists work in all three areas.

Before a radiologic technologist can perform any work on a patient, a physician must issue a requisition ordering the work done. Similar to prescriptions for drugs, these requisitions assure that radiologic technologists treat only those people certified as needing such treatment by physicians.

Radiologic technologists prepare patients for X-ray examinations, assuring that they remove any articles of clothing, such as belt buckles or jewelry, through which X-rays cannot pass. They then position the patients, either on a table or standing, so that the correct parts of the body can be radiographed, always taking care not to aggravate injuries or make the patients uncomfortable. To prevent unnecessary X-ray exposure to unaffected parts, the technologist surrounds the exposed area with radiation protection devices, such as lead plates.

After the necessary preparations, the technologist positions the X-ray machine at the correct angle and height over the appropriate area of a patient's body. Using instruments like a measuring tape, the technologist estimates the thickness of the section to be radiographed. He or she sets the proper controls on the machine, such as those regulating exposure time, to produce X-rays of the right density, detail, and contrast. The technologist then places a properly identified X-ray film of the correct size under the part of the patient's body to be examined, and turns on the machine. Afterward, the technologist removes the film and develops it for analysis by a radiologist. Throughout the procedure, the technologist is careful to use only as much radiation as is necessary to obtain a good diagnostic examination.

When examining a patient using fluoroscopy (watching a patient's internal body movements on a monitor or screen), the radiologic technologist prepares a solution of barium sulphate for the patient to drink. As this solution passes through the patient's digestive tract, a physician looks for diseases, injuries, or defects in the patient's digestive system. When fluoroscopic examinations are performed, whether on the digestive tract or on other parts of the body such as chest, heart, or bones, the technologist assists the physician by properly preparing and positioning the patient, adjusting the machine, and applying the correct exposure.

In radiation therapy, which is mainly used for treating cancer, the radiologic technologist works under the close supervision of a radiologist. Directed by a radiologist, the technologist applies the correct amount of radiation for the proper period of time to the affected part of the patient's body. The technologist also must keep adequate records of the treatment and is responsible for the comfort and safety of the patient during the treatment time.

In nuclear medicine, the radiologic technologist also works under the direct supervision of a radiologist. This technologist prepares solutions containing radioactive material that, when swallowed by the patient or injected, is absorbed by the patient's internal organs. Because diseased tissues generally react differently from healthy ones when subjected to radioactive substances, it is possible to trace the development of disease. The technologist uses special cameras or scanners that pick up the radioactivity, and operates instruments that measure the intensity of the radioactivity.

In addition to the duties involved in operating X-ray equipment, radiologic technologists may have certain administrative tasks. Technologists prepare and maintain patients' records—keeping track of the developed film, the date it was taken, and the radiologist's diagnosis. They also may maintain files, schedule appointments, and prepare work schedules for assistants.

Some radiologic technologists are full-time instructors in X-ray techniques, teaching in programs of radiologic technology.

Places of Employment

About 80,000 persons worked as radiologic technologists in 1976. Hospitals employ about three-fourths of all radiologic technologists; most of the remainder work in medical laboratories, physicians' and dentists' offices or clinics, Federal and State health agencies, and public school systems.

Training, Other Qualifications, and Advancement

The requirement for entry into this field is the completion of a formal education program in X-ray technology. In 1976, about 1,100 programs in X-ray technology offered by hospitals, medical schools affiliated with hospitals, colleges, and universities were approved by the American Medical Association (AMA).

Education also may be obtained in the military service or through courses in X-ray technology offered by vocational or technical schools. Programs vary in length from 2 to 4 years. Some colleges award a baccalaureate degree in radiologic technology. While employers generally pay graduates of bachelor's degree programs the same starting salaries as those of 2- and 3-year programs, there is more potential for promotion for those holding the baccalaureate degree. It is advantageous for those planning to be educators or administrators in this field to pursue the baccalaureate and master's degrees as preparation.

All programs accept only high school graduates or the equivalent. Courses in mathematics, physics, chemistry, biology, and typing are helpful.

X-ray technology programs include courses in anatomy, physiology, nursing procedures, physics, radiation protection, film processing, principles of radiographic exposure, medical terminology, radiographic positioning, medical ethics, and department administration.

Registration with the American Registry of Radiologic Technologists is an asset in obtaining highly skilled and specialized positions. Registration requirements include graduation from an approved program of medical X-ray technology and the satisfactory completion of a written examination. After registration, the title "Registered Technologist (ARRT)" may be used. Once registered, technologists may be certified in radiation therapy or nuclear medicine by completing an additional year of combined classroom study and clinical education.

Good health, emotional stability, and a sincere desire to work with the sick and disabled are important qualifications for this field.

As openings occur, some technologists in large X-ray departments may qualify as instructors in X-ray techniques or advance to supervisory X-ray technologists.

Employment Outlook

Employment in the field of radiologic technology is expected to expand faster than the average for all occupations through the mid-1980's as X-ray equipment is increasingly used to diagnose and treat diseases. The demand for radiologic technologists also will increase as prepaid medical programs extend medical care to wider segments of the population. Part-time workers will find the best opportunities in physicians' offices and clinics where full-time radiologic services usually are not required.

Although the demand for radiologic technologists should continue to be strong, the number of graduates of AMA-approved programs in this field also is expected to grow rapidly during the period. If present enrollment patterns continue, the number seeking to enter the occupation is likely to exceed the number of openings from growth and replacement needs. As a result, graduates may face competition for positions of their choice.

Earnings and Working Conditions

Starting salaries of radiologic technologists employed in hospitals and medical centers averaged about $9,000 a year in 1976, according to a national survey conducted by the University of Texas Medical Branch. Experienced radiologic technologists averaged $11,300 a year, or slightly more than the average for all nonsupervisory workers in private industry, except farming.

The Federal Government paid new graduates of AMA-approved schools of X-ray technology starting salaries of $8,316 a year in 1977.

Full-time technologists generally work 8 hours a day and 40 hours a week but may be "on call" for some weekend or night emergency duty. Sick leave, vacations, insurance, and other benefits are comparable to those covering other workers in the same organization.

There are potential radiation hazards in this field; however, these hazards have been greatly reduced by the use of safety devices such as instruments that measure radiation exposure, lead aprons, gloves, and other shielding.

Sources of Additional Information

For additional information about programs and careers in radiologic technology, write:

The American Society of Radiologic Technologists, 500 N. Michigan Ave., Suite 836, Chicago, Ill. 60611.

RESPIRATORY THERAPY WORKERS

(D.O.T. 079.368)

Nature of the Work

Respiratory therapy workers, sometimes called inhalation therapy workers, treat patients with cardiorespiratory problems. This treatment may range from giving temporary relief to patients with chronic asthma or emphysema to giving emergency care in cases of heart failure, stroke, drowning, and shock. Respiratory therapy workers also are among the first medical specialists called for emergency treatment of acute respiratory conditions arising from head injury or drug poisoning. The therapy worker's role is a highly responsible one because if a patient stops breathing for longer than 3 to 5 minutes, there is little chance of recovery without brain damage, and if oxygen is cut off for more than 9 minutes, death results.

Following doctors' orders, respiratory therapy workers use special equipment such as respirators and positive-pressure breathing machines to treat patients who need temporary or emergency respiratory assistance. For example, they use aerosol inhalants to administer medication so that it is confined to the lungs. They also show patients and their families how to use equipment at home. Other duties include keeping records of the cost of materials and charges to patients, and maintaining and making minor repairs to equipment.

There are three levels of workers within the field of respiratory therapy: therapists, technicians, and assistants. Therapists and technicians perform essentially the same duties. However, the therapist is expected to have a higher level of expertise and may be expected to assume some teaching and supervisory duties. Respiratory assistants have little contact with patients and spend most of their time taking care of the equipment, including cleaning, sterilizing, and storing it. Many are new to the job and are training to advance to the technician or therapist level.

Places of Employment

About 36,000 persons worked as respiratory therapists, technicians, or assistants in 1976. Most work in hospitals, in respiratory therapy, anesthesiology, or pulmonary medicine departments. Others work for oxygen equipment rental companies, ambulance services, nursing homes, and universities.

Training, Other Qualifications, and Advancement

Respiratory apparatus has become increasingly complex in recent years and, although a few respiratory therapy workers are trained on the job, formal training now is stressed for entry to the field.

In 1976, about 200 institutions offered programs in respiratory therapy that were approved by the Council on Medical Education of the American Medical Association. High school graduation is required for entry to these programs. Courses vary in length between 18 months and 4 years and include both theory and clinical work. A bachelor's degree is awarded for completion of a 4-year program and an associate degree for shorter courses. Areas of study include human anatomy and physiology, chemistry, physics, microbiology, and mathematics. Technical courses offered deal with procedures, equipment, and clinical tests.

Respiratory therapists who have a certificate of completion from an AMA-approved therapist training program, 62 semester hours of college credit, and 1 year of experience following completion of the program are eligible to apply for registration by the National Board for Respiratory Therapy (NBRT). The registry examination consists of written and oral tests. Applicants must pass both to be awarded the Registered Respiratory Therapist (RRT) credential. In 1976, about 4,500 therapists had been registered.

Individuals who complete an AMA-approved technician training program and have 1 year of experience in respiratory therapy may apply to the NBRT for examination for the Certified Respiratory Therapy Technician (CRTT) credential. The CRTT examination is less comprehensive than the registry examination and consists of a single written test. Approximately 16,000 respiratory technicians had been certified in 1976.

In contrast to therapists and technicians, there are no general requirements for the position of respiratory assistant. The only requirements are those set by the head of the hospital department that is hiring workers. For example, some may require only a high school diploma.

Respiratory therapists can advance to assistant chief, chief therapist, or, with graduate education, to instructor of respiratory therapy at the college level. Respiratory technicians and assistants can advance to the therapist level by taking the appropriate training courses.

People who want to enter the respiratory therapy field should enjoy working with patients and should understand their physical and psychological needs. Respiratory therapy workers must be able to pay attention to detail, follow instructions, and work as part of a team. Operating the complicated respiratory therapy equipment also requires mechanical ability and manual dexterity. High school students interested in a career in this field are encouraged to take courses in health, biology, mathematics, physics, and bookkeeping.

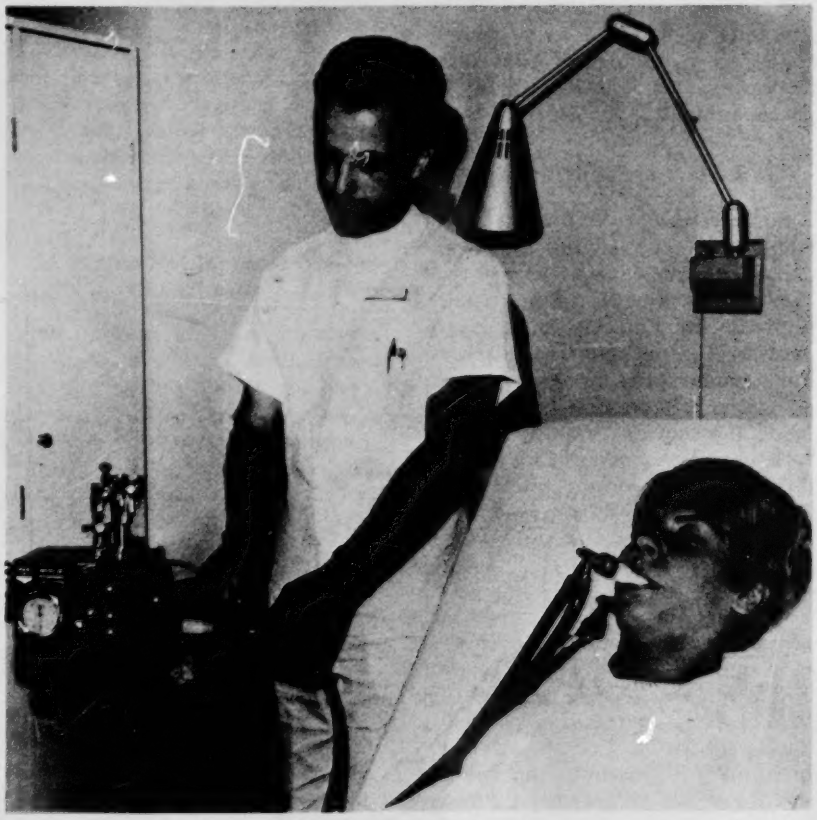
Employment Outlook

Employment opportunities for respiratory therapy workers are expected to be good through the mid-1980's. Those with advanced training in respiratory therapy will be in demand to fill teaching and supervisory positions.

Employment of respiratory therapy workers is expected to grow much faster than the average for all occupations. Stimulating demand will be new and expanding uses for respiratory therapy and the growth in health services in general. Many specialists in respiratory therapy will be hired to release nurses and other personnel from respiratory therapy work; other openings will arise from the need to replace those who retire, die, or leave the occupation for other reasons.

Earnings and Working Conditions

The starting salary of respiratory therapists employed in hospitals and



Operation of respiratory equipment requires mechanical ability and manual dexterity.

medical centers averaged about $9,900 a year in 1976, according to a survey conducted by the University of Texas Medical Branch. Top salaries of experienced respiratory therapists in hospitals ranged as high as $17,600 a year. Salaries of respiratory technicians and assistants are lower than those of respiratory therapists.

The Federal Government paid respiratory therapists starting salaries of $7,408 a year in 1977 if they had 1 year of AMA-accredited postsecondary training, and $8,316 for those with 2 years of AMA-accredited training.

Respiratory therapy workers in hospitals receive the same benefits as other hospital personnel, including hospitalization, paid vacations, and sick leave. Some institutions provide tuition assistance or free courses, pension programs, uniforms, and parking.

Respiratory therapy workers generally have a 40-hour week. After-hours and weekend duty is generally required because most hospitals have 24-hour coverage throughout the week. Adherence to safety precautions and regular testing of equipment minimize the potential hazard of fire to workers and patients.

Sources of Additional Information

Information concerning education programs is available from:

American Association for Respiratory Therapy, 7411 Hines Place, Dallas, Tex. 75235.

Information on the certification of respiratory therapists and respiratory technicians can be obtained from:

The National Board for Respiratory Therapy, Inc., 1900 West 47th Place, Suite 124, Shawnee Mission, Kansas 66205.

On-the-job training information can be obtained at local hospitals.

☆ U.S. GOVERNMENT PRINTING OFFICE : 1977 O—248-025

What to Look For in this Reprint

To make the *Occupational Outlook Handbook* easier to use, each occupation or industry follows the same outline. Separate sections describe basic elements, such as work on the job, education and training needed, and salaries or wages. Some sections will be more useful if you know how to interpret the information as explained below.

The TRAINING, OTHER QUALIFICATIONS, AND ADVANCEMENT section indicates the preferred way to enter each occupation and alternative ways to obtain training. Read this section carefully because early planning makes many fields easier to enter. Also, the level at which you enter and the speed with which you advance often depend on your training. If you are a student, you may want to consider taking those courses thought useful for the occupations which interest you.

Besides training, you may need a State license or certificate. The training section indicates which occupations generally require these. Check requirements in the State where you plan to work because State regulations vary.

Whether an occupation suits your personality is another important area to explore. For some, you may have to make responsible decisions in a highly competitive atmosphere. For others, you may do only routine tasks under close supervision. To work successfully in a particular job, you may have to do one or more of the following:

- motivate others
- direct and supervise others
- work with all types of people
- work with things—you need good coordination and manual dexterity
- work independently—you need initiative and self-discipline
- work as part of a team
- work with details, perhaps numbers or laboratory reports
- help people
- use creative talents and ideas
- work in a confined area
- do physically hard or dangerous work
- work outside in all types of weather

A counselor can help you find out more about your interests and abilities so you can judge whether a job's characteristics suit you.

The EMPLOYMENT OUTLOOK section tells whether or not the job market is likely to be favorable. Usually an occupation's expected growth is compared to the average projected growth rate for all occupations (20.1 percent between 1976 and 1985). The following phrases are used:

Much faster	50% or more
Faster	25.0 to 49.9%
About as fast	15.0 to 24.9%
Slower	4.0 to 14.9%
Little change	3.9 to -3.9%
Decline	-4.0% or more

Generally, job opportunities are favorable if employment is growing at least as fast as for the economy as a whole.

But, you would have to know the number of people competing with you to be sure of your prospects. Unfortunately, this supply information is lacking for most occupations.

There are exceptions, however, especially among professional occupations. Nearly everyone who earns a medical degree, for example, becomes a practicing physician. When the number of people pursuing relevant types of education and training and then entering the field can be compared with the demand, the outlook section indicates the supply/demand relationship as follows:

Excellent	Demand much greater than supply
Very good	Demand greater than supply
Good or favorable	Rough balance between demand and supply
May face competition	Likelihood of more supply than demand
Keen competition	Supply greater than demand

Competition or few job openings should not stop your pursuing a career that matches your aptitudes and interests. Even small or overcrowded occupations provide some jobs. So do those in which employment is growing very slowly or declining.

Growth in an occupation is not the only source of job openings because the number of openings from turnover can be substantial in large occupations. In fact, replacement needs are expected to create 70 percent of all openings between 1976 and 1985.

Finally, job prospects in your area may differ from those in the Nation as a whole. Your State employment service can furnish local information.

The EARNINGS section tells what workers were earning in 1976.

Which jobs pay the most is a hard question to answer because good information is available for only one type of earnings—wages and salaries—and not even this for all occupations. Although 9 out of 10 workers receive this form of income, many earn extra money by working overtime, night shifts, or irregular schedules. In some occupations, workers also receive tips or commissions based on sales or service. Some factory workers are paid a piece rate—an extra payment for each item they make.

The remaining 10 percent of all workers—the self-employed—includes people in many occupations—physicians, barbers, writers, and farmers, for example. Earnings for self-employed workers even in the same occupation differ widely because much depends on whether one is just starting out or has an established business.

Most wage and salary workers receive fringe benefits, such as paid vacations, holidays, and sick leave.

Workers also receive income in goods and services (payment in kind). Sales workers in department stores, for example, often receive discounts on merchandise.

Despite difficulties in determining exactly what people earn on the job, the Earnings section does compare occupational earnings by indicating whether a certain job pays more or less than the average for all nonsupervisors in private industry, excluding farming.

Each occupation has many pay levels. Beginners almost always earn less than workers who have been on the job for some time. Earnings also vary by geographic location but cities that offer the highest earnings often are those where living costs are most expensive.